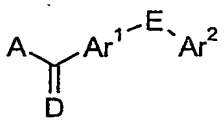
CLAIMS

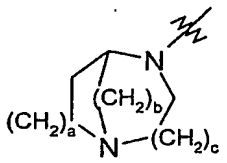
1. A compound of formula I:



I

wherein:

A is a moiety of formula II:



II

D is oxygen or sulfur;

E is a single bond, oxygen, sulfur, or NR^3;

Ar^1 is a 5- or 6-membered aromatic heterocyclic ring having 1, 2 or 3 heteroatoms selected from nitrogen, oxygen or sulfur where not more than one of said heteroatoms is oxygen or sulfur, or

Ar^1 is phenyl;

Ar^2 is a 5- or 6-membered aromatic heterocyclic ring having 1, 2 or 3 heteroatoms selected from nitrogen, oxygen or sulfur where not more than one of said heteroatoms is oxygen or sulfur, or

Ar^2 is phenyl, or

Ar^2 is an 8- or 9-, or 10-membered fused aromatic carbocyclic ring or fused aromatic heterocyclic ring having 1, 2 or 3 heteroatoms selected from nitrogen, oxygen or sulfur where not more than one of said heteroatoms is oxygen or sulfur, or an 8- or 9-, or 10-membered aromatic carbocyclic ring;

the rings Ar^1 and Ar^2 are substituted with 0, 1, 2 or 3 substituents selected from: halogen, C_{1-4}alkyl, C_{2-4}alkenyl, C_{2-4}alkynyl, CN, NO_2, CF_3 NR^1R^2, $CH_2NR^1R^2$, OR^2, CH_2OR^2 or CO_2R^3;

$R^1$and R^2 at each occurrence are independently selected from hydrogen, C_{1-4}alkyl, aryl, heteroaryl, $C(O)R^3$, $C(O)NHR^3$, CO_2R^3 or SO_2R^3, or

R^1 and R^2 in combination is $-(CH_2)_jG(CH_2)_k-$ wherein G is oxygen, sulfur, NR^3, or a bond;

a, b and c are each 1 or 2;

j is 2, 3 or 4;

k is 0, 1 or 2, and

R^3 at each occurrence is independently selected from hydrogen, C_{1-4}alkyl, aryl, or heteroaryl;

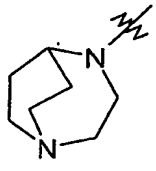
or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

2. A compound according to Claim 1, wherein D is oxygen.

3. A compound according to Claim 2, wherein E is a single bond.

4. A compound according to Claim 2, wherein E is oxygen or NR^3.

5. A compound according to Claim 1, wherein A is



II

or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

6. A compound of Claim 1, wherein

Ar^1 is a 5- or 6-membered aromatic heterocyclic ring having 1 or 2 heteroatoms selected from nitrogen, oxygen or sulfur where not more than one of said heteroatoms is oxygen or sulfur, or

Ar^1 is phenyl,

or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

7. A compound according to Claim 6 wherein Ar^1 is a benzene ring, furan ring or thiophene ring.

8. A compound according to Claim 1, wherein

Ar^2 is a 5- or 6-membered aromatic heterocyclic ring having 1 or 2 heteroatoms selected from nitrogen, oxygen or sulfur where not more than one of said heteroatoms is oxygen or sulfur, or a phenyl,

or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

9. A compound according to Claim 8, wherein Ar^2 is a benzene ring, furan ring, thiophene ring, or pyridine ring.

10. A compound according to Claim 1, wherein

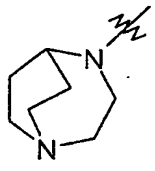
the $-EAr^2$ and the C(=D)A moieties on Ar^1 are positioned in a 1,3-relationship relative to each other;

or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

11. A compound according to Claim 1, wherein Ar^1 or Ar^2 is substituted with 0 or 1 substituents selected from: halogen, C_{1-4}alkyl, C_{2-4}alkenyl, C_{2-4}alkynyl, CN, NO_2, NR^1R^2, $CH_2NR^1R^2$, OR^3, CH_2OR^3, CO_2R^3 or CF_3;

or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

12. A compound according to Claim 1, wherein A is a moiety of formula II:



II

D is oxygen;

E is a single bond;

Ar^1 is a 5- or 6-membered aromatic heterocyclic ring having 1, 2 or 3 heteroatoms selected from nitrogen, oxygen or sulfur where not more than 1 of said heteroatoms is oxygen or sulfur, or

Ar^1 is phenyl

Ar^2 is a 5- or 6-membered aromatic heterocyclic ring having 1, 2 or 3 heteroatoms selected from nitrogen, oxygen or sulfur where not more than 1 of said heteroatoms is oxygen or sulfur, or

Ar^2 is phenyl,

or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

13. A compound of Claim 12, wherein Ar^1 is a benzene ring, furan ring or thiophene ring.

14. A compound according to Claim 1, having the groups $-EAr^2$ and -C(=O)A, positioned in a 1,3-relationship relative to each other and wherein Ar^2 has 0 or 1 substituents selected from: halogen, C_{1-4}alkyl, C_{2-4}alkenyl, C_{2-4}alkynyl, CN, NO_2, NR^1R^2, $CH_2NR^1R^2$, OR^1, CH_2OR^1, CO_2R^3 or CF_3;
or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

15. A compound according to Claim 1, selected from:
(1,4-diazabicyclo[3.2.2]non-4-yl)(biphenyl-3-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(3-(2-pyridyl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(3-(3-pyridyl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(3-(4-pyridyl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(3-(furan-2-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(3-(furan-3-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(3-(thiophen-2-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(3-(thiophen-3-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(biphenyl-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(2-pyridyl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(3-pyridyl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(4-pyridyl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(furan-2-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(furan-3-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(thiophen-2-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(thiophen-3-yl)phenyl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-phenylfuran-2-yl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(2-pyridyl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(3-pyridyl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(4-pyridyl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(furan-2-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(furan-3-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(thiophen-2-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(thiophen-3-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-phenylthiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(2-pyridyl)thiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(3-pyridyl)thiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(4-pyridyl)thiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(furan-2-yl)thiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(furan-3-yl)thiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(thiophen-2-yl)thiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(thiophen-3-yl)thiophen-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-phenylfuran-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(2-pyridyl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(3-pyridyl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(4-pyridyl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(furan-2-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(furan-3-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(thiophen-2-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(thiophen-3-yl)furan-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-phenylthiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(2-pyridyl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(3-pyridyl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(4-pyridyl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(furan-2-yl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(furan-3-yl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(thiophen-2-yl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(5-(thiophen-3-yl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-phenylfuran-4-yl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(2-pyridyl)furan-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(3-pyridyl)furan-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(4-pyridyl)furan-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(furan-2-yl)furan-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(furan-3-yl)furan-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(thiophen-2-yl)furan-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(2-(thiophen-3-yl)furan-4-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-phenylthiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(2-pyridyl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(3-pyridyl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(4-pyridyl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(furan-2-yl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(furan-3-yl)thiophen-2-yl)methanone;
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(thiophen-2-yl)thiophen-2-yl)methanone, or
(1,4-diazabicyclo[3.2.2]non-4-yl)(4-(thiophen-3-yl)thiophen-2-yl)methanone,
or a diastereoisomer, enantiomer or pharmaceutically-acceptable salt thereof.

16. A compound according to any one of Claims 1 to 15, for use in therapy.

17. A compound according to any one of Claims 1 to 15, for use as a medicament.

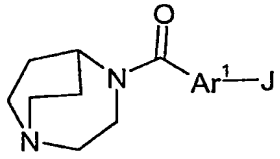
18. Use of a compound as defined in any one of claims 1 to 15, in the manufacture of a medicament for the treatment or prophylaxis of psychotic disorders, intellectual impairment disorders, human diseases or conditions in which activation of the α7 nicotinic receptor is beneficial, Alzheimer's disease, learning deficit, cognition deficit, attention deficit, memory loss, Lewy Body Dementia, Attention Deficit Hyperactivity Disorder, anxiety, schizophrenia, mania or manic depression, Parkinson's disease, Huntington's disease, Tourette's syndrome, neurodegenerative disorders in which there is loss of cholinergic synapse, jetlag, cessation of smoking, nicotine addiction including that resulting from exposure to products containing nicotine, pain, ulcerative colitis or irritable bowel syndrome.

19. A method of treatment or prophylaxis of psychotic disorders, intellectual impairment disorders, human diseases or conditions in which activation of the α7 nicotinic receptor is beneficial, Alzheimer's disease, learning deficit, cognition deficit, attention deficit, memory loss, Lewy Body Dementia, Attention Deficit Hyperactivity Disorder, anxiety, schizophrenia, mania or manic depression, Parkinson's disease, Huntington's disease, Tourette's syndrome, neurodegenerative disorders in which there is loss of cholinergic synapse, jetlag, cessation of smoking, nicotine addiction including that resulting from exposure to products containing nicotine, pain, or ulcerative colitis which method comprises administering a therapeutically effective amount of a compound as defined in any one of Claims 1 to 15.

20. A pharmaceutical composition comprising a compound of formula I, as defined in any one of claims 1 to 15, together with at least one pharmaceutically-acceptable excipient or diluent.

21. A process for the preparation of a compound of formula I, as defined in any one of claims 1 to 15, which comprises:

reacting a compound of formula VI:



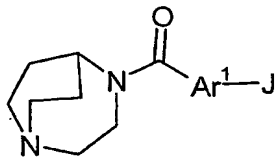
VI

wherein J represents halogen, or OSO_2CF_3 substituent at the position of ring Ar^1 at which the bond to ring Ar^2 is formed with a organometallic compound of formula VII;

$$Ar^2—M \qquad VII$$

in the presence of a organometallic catalyst and solvent.

22. A compound of formula VI:



VI

wherein:

Ar^1 is a benzene, furan, or thiophene ring;

J is halogen, or OSO_2CF_3, provided that when Ar^1 is a benzene ring, J may only represent halogen or OSO_2CF_3 in a position meta or para to the carboxamide group; or an enantiomer thereof or pharmaceutically-acceptable salts thereof.

23. A compound according to Claim 22, selected from:

(1,4-diazabicyclo[3.2.2]non-4-yl)(5-bromofuran-2-yl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(5-bromothiophen-2-yl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(3-bromophenyl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(4-bromophenyl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(3-iodophenyl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(4-iodophenyl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(4-bromothiophen-2-yl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(5-bromothiophen-3-yl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(5-bromofuran-2-yl)methanone;

(1,4-diazabicyclo[3.2.2]non-4-yl)(5-bromofuran-2-yl)methanone, and

(1,4-diazabicyclo[3.2.2]non-4-yl)(5-bromofuran-2-yl)methanone;

or enantiomers thereof, or pharmaceutically-acceptable salts thereof.